

REMARKS

Claims 1-5, 7 and 9-25 are now presented for examination. Claims 1, 10, 17, and 20 have been amended to define still more clearly what Applicants regard as their invention. Claims 24 and 25 have been added to provide Applicants with a more complete scope of protection. Claims 1 and 10 are in independent form. Favorable reconsideration is requested.

Claims 17 and 20 have been objected to, requiring that the antecedent basis of the recitation "surface observation apparatus" be corrected. In response, Applicants have changed "The surface observation apparatus" to -A surface observation apparatus-, as recommended by the Examiner.

Claim 1 was rejected under 35 U.S.C. § 112, second paragraph, as indefinite. Applicants have amended Claim 1 to read "the end of said *tip* is. . . ." Applicants believe that the rejection under Section 112, second paragraph, has been obviated, and its withdrawal is therefore respectfully requested.

Claims 1, 17-19, and 23 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,351,229 (Brezoczsky et al.). Applicants respectfully traverse this rejection.

Claims 2-4, 9, and 17-19 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Brezoczsky et al.; Claims 5, 7, and 17-19 as being unpatentable over Brezoczsky et al. in view of U.S. Patent No. 5,354,985 (Quate); Claims 10-14, 16, and 20-22 as being unpatentable over Quate in view of U.S. Patent No. 6,396,050 B1 (Yamamoto et al.); and Claims 15 and 20-22 as being unpatentable over Yamamoto et al. in view of U.S. Patent No. 5,902,715 (Tsukamoto et al.). Applicants respectfully traverse these rejections.

Applicants submit that amended independent Claims 1 and 10, together with the remaining claims dependent thereon, are patentably distinct from the cited prior art at least for the following reasons.

Claim 1 is directed to a probe for detecting light or irradiating light. The probe includes a cantilever supported at an end by a substrate, a hollow tip formed at a free end of the cantilever, a microaperture formed at the end of the tip, and a groove formed inside the cantilever. The groove includes a hollow waveguide and a mirror.

The direction of the end of the tip is substantially perpendicular to the longitudinal direction of the cantilever, and the mirror is an end face of the groove and reflects the light entering from the microaperture toward the hollow waveguide or reflects the light transmitted in the hollow waveguide toward the microaperture.

Important features of Claim 1 is that the groove includes the hollow waveguide and the mirror, and the mirror is an end face of the groove. Support in the specification for these features can be found at least at page 10, lines 15-17; at page 11, lines 10-20; from page 18, line 25, to page 19, line 3; at page 19, lines 4-14; and Figures 3A-4C.

Brezoczsky et al., as understood by Applicants, relates to a tribo-attractive contact slider for an optical read/write system. Applicants note that the slider 51 (see Figs. 4 and 5) is not hollow and has a lens 64. In contrast, the present invention as recited in Claim 1 includes a groove formed inside a cantilever that includes a *hollow* waveguide and a mirror. In addition, in Brezoczsky et al., a light arrives at an optical disk 30 (see Fig. 5) via the lens 64. With these structural features (as shown in Fig. 5), the contact slider in Brezoczsky et al. could not obtain the advantageous effect of the present invention as recited in Claim 1 that a continuous space formed by both the hollows of the waveguide

and the tip realize their easy optical connection and low light transmission loss.

Accordingly, since Applicants have found nothing in Brezoczsky et al. that would teach or suggest a probe that includes a groove comprising the hollow waveguide and the mirror, where the mirror is an end face of the groove, Applicants submit that at least for this reason, that Claim 1 is patentable over Brezoczsky et al.

Claim 10 is directed to a method for producing a probe for light detection or light irradiation. The method includes the steps of working a substrate to form a groove and a mirror at an end of the groove therein, with the mirror being a slanted or a concave end face of the groove; forming a flat plate-shaped cover portion on the groove to form a hollow waveguide having an opening in a part thereof; forming a hollow tip having a microaperture on the opening; and removing a part of the substrate by etching, to form a cantilever.

Important features of Claim 10 are the utilizing of a groove as the waveguide and the step of working a substrate to form a groove and a mirror at an end of the groove therein, with the mirror being a slanted or a concave end face of the groove.

Quate, as understood by Applicants, relates to a near field scanning optical and force microscope that includes a cantilever and an optical waveguide. In Quate, the Si_3N_4 film 51 shown in Figure 5A functions as a waveguide, connecting with a pyramidal tip 52. Light passing through the film 51 is reflected on the side face of the tip 52 and is condensed at the opening of the tip. In contrast, the present invention as recited in Claim 10 includes a groove formed in the cantilever (as compared to a thin film 51) that functions as a waveguide. The utilizing of such a groove in Claim 10 makes it possible to form the mirror as an end face of the groove, whereby the optical connection of the waveguide and the tip can be easily realized in order to obtain a probe having little light transmission loss.

In addition, in Quate, the pyramidal tip 52 functions as a reflecting face and is located independently of the Si_3N_4 film as a waveguide. Consequently, there is no relationship between the waveguide and mirror in Quate. Moreover, the mirror of the present invention as recited in Claim 10 has a slant or concave shape and therefore directs all the striking light to the microaperture. Consequently, the efficiency of the optical connection between the waveguide and the aperture is greater than the efficiency of the optical connection in Quate.

Yamamoto et al., as understood by Applicants, relates to a self-emitting optical probe, a method for producing the same, and a scanning near-field optical microscope. In Yamamoto et al., the waveguide is comprised of a hollow fiber, not a groove as recited in Claim 10. (See, e.g., col. 3, lines 40-44, which states, "[i]n the case of an optical probe using an ordinary optical *fiber* [emphasis added], the usable wavelength is limited by the fiber structure and the material constituting the fiber core portion which functions as the waveguide.") Such a hollow fiber cannot have a mirror face even if, for example, it is cut slantwise to expose an end face. As such, in Yamamoto et al., the invention requires that an additional portion, such as a dielectric substance, be arranged at an end portion of the waveguide. In contrast, the present invention as recited in Claim 10 utilizes the end face itself as the mirror so that it is not necessary to provide another reflective member such as the dielectric substance layer.

Applicants submit that, at least for the reasons discussed above, the proposed combination of Quate and Yamamoto et al., assuming such combination would even be permissible, would still fail to teach or suggest the utilizing of a groove as the waveguide and the step of working a substrate to form a groove and a mirror at an end of the groove therein, with the mirror being a slanted or a concave end face of the groove, as

recited in Claim 10. Accordingly, Applicants submit that Claim 10 is patentable over these two patents, taken separately or in any proper combination.

A review of the other art of record including Tsukamoto et al. has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.


The other claims in this application, including new Claims 24 and 25, are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration or reconsideration, as the case may be, of the patentability of each on its own merits is respectfully requested.

This Amendment After Final Action is believed to place this application in condition for allowance and, therefore, its entry is believed proper under 37 C.F.R. § 1.116. Accordingly, entry of this Amendment After Final Action, as an earnest effort to advance prosecution and reduce the number of issues, is respectfully requested. Should the Examiner believe that issues remain outstanding, it is respectfully requested that the Examiner contact Applicants' undersigned attorney in an effort to resolve such issues and advance the case to issue.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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Amendments in a Revised Format Now Permitted

**Office of Patent Legal Administration << Pre-OG Notices << << Amendments in a Revised Format Now Permitted**

The United States Patent and Trademark Office (USPTO or Office) is permitting applicants to submit amendments in a revised format as set forth herein. The revised amendment format is essentially the same as the amendment format that the Office is considering adopting via a revision to 37 CFR 1.121 (Manner of Making Amendments). The revision to 37 CFR 1.121 (if adopted) will simplify amendment submission and improve file management. The Office plans to adopt such a revision to 37 CFR 1.121 by July of 2003, at which point compliance with revised 37 CFR 1.121 will be mandatory.

The revised amendment format is an expansion of the special amendment process instituted for a prototype Electronic File Wrapper program described in USPTO ANNOUNCES PROTOTYPE OF IMAGE PROCESSING, 1265 Off. Gaz. Pat. Office 87 (Dec. 17, 2002) ("Prototype Announcement"). The special amendment process (which was limited to claims) has proven overwhelmingly acceptable to applicants participating in the prototype and beneficial to examiners. The revised amendment format provides for amendments to be made to the specification and the drawings in addition to the claims.

Effective immediately, **all** applicants, including applicants participating in the prototype, may submit amendments using the revised amendment format set forth herein. Applicants may wish to submit all amendments in the revised amendment format because: (1) it will facilitate transition to a revised amendment format when it becomes mandatory, (2) inconsistent versions of claim amendments (clean and marked-up) will be avoided, and (3) time and resources will be saved.

WAIVER of 37 CFR 1.121

The provisions of 37 CFR 1.121(a), (b), (c) and (d) are waived for amendments to the **claims, specification, and drawings** in all applications in all Technology Centers where the amendments comply with the revised amendment format detailed below. Note: The revised amendment format (and the waiver) does **not** apply to 37 CFR 1.121(h) and (i) which indicate that amendments to reissue applications and reexamination proceedings are governed by 37 CFR 1.173 for reissue applications and 37 CFR 1.530 (d)-(k) for *ex parte* and *inter partes* reexaminations.

In addition, the WAIVER indicated in the above mentioned Prototype Announcement for the limited (claims only) amendment process of that prototype is also expressly continued and amendments in applications (other than reissue applications) in all Technology Centers that comply with the requirements in that announcement will be acceptable.

REVISED AMENDMENT FORMAT**I. Begin Sections on Separate Sheets:**

Each section of an amendment paper (e.g., Amendments to the Specification, Amendments to the Claims, Remarks) shall begin on a separate sheet to facilitate separate indexing and electronic scanning of the document.

For example, each of the following four sections of an amendment paper must start on a separate sheet:

- a.) Introductory Comments

- b.) Amendments to the Specification
- c.) Amendments to the Claims
- d.) Remarks

II. Submit Only One Version (with markings) of an Amended Part:

The requirement to provide two versions of a replacement paragraph, section, or claim (a clean version and a marked up version), as set forth in current 37 CFR 1.121, is waived where the format set forth below is followed.

III. Amendments to the Claims

A. A Complete Listing of Claims is Always Required:

If an amendment adds, changes or deletes any claim, a detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remains under examination in the application, must be presented, and the amendment to the claims is expressed in the listing. The listing shall be presented as follows:

1. Ascending Order and Status Identifier Required

The listing shall be provided in sequential ascending numerical order (beginning with claim 1). A status identifier shall be provided for every claim in a parenthetical expression following the claim number (e.g., "Claim 1. (original)"). A list of acceptable status identifiers is set forth in part B, below. The text of **all** claims under examination shall be submitted each time any claim is amended. Cancelled and withdrawn claims should be indicated by only the claim number and status. The text of cancelled or withdrawn claims should not be presented.

2. Markings in Currently Amended Claims Required

All claims *being currently amended* shall be submitted with markings to indicate the changes that have been made relative to the immediate prior version of the claims. The changes in any amended claim should be shown by strikethrough (for deleted matter) or underlining (for added matter). No separate "clean" version should be submitted for currently amended claims, as this requirement has been eliminated. **Markings should only be made in claims being currently amended in an amendment paper.**

3. Only Clean Text Required for Other Claims Under Examination.

The text of pending claims *not being currently amended* that are under examination shall be presented in a clean version in the listing. Any claim presented in clean version constitutes an assertion that it has not been changed relative to the immediate prior version.

4. Status to Effect Claim Cancellation or Addition.

A claim may be cancelled by merely indicating the status of the claim as cancelled. Any new claim added by amendment must be indicated by the appropriate status identifier and shall not be underlined. Thus, added new claims of status (new), (reinstated - formerly claim #_) and (re-presented - formerly dependent claim #_) must be presented in clean version. Additional claims may be subject to additional fees, as appropriate.

5. When Grouping of Claims is Permitted.

Consecutive cancelled or withdrawn claims may be aggregated into one line of the listing (e.g. Claims 1 - 5 (cancelled)).

6. Use "Currently Amended" Status Where Applicable.

If any "previously reinstated" or "previously re-presented" claim is being amended, the status shall be indicated as "currently amended" with markings as indicated in paragraph A2, above. Multiple status identifiers should not be used for any single claim.

B. Status Identifiers that May be Used:

In order to promote uniformity and consistency, only the following eleven (11) defined status identifiers should be used to indicate the status of the claims (in parentheses after the claim number):

- | | |
|--|---|
| 1. (Original): | Claim filed with the application following the specification (i.e., not added by preliminary amendment). |
| 2. (Currently amended): | Claim being amended in the current amendment paper. |
| 3. (Previously amended): | Claim not being currently amended, but which was amended in a previous amendment paper. |
| 4. (Cancelled): | Claim cancelled or deleted from the application. |
| 5. (Withdrawn): | Claim still in the application, but in a non-elected status. |
| 6. (Previously added): | Claim added in an earlier amendment paper. |
| 7. (New): | Claim being added in the current amendment paper. |
| 8. (Reinstated - formerly claim # _): | Claim deleted in an earlier amendment paper, but re-presented with a new claim number in current amendment. |
| 9. (Previously reinstated): | Claim deleted in an earlier amendment and reinstated in an earlier amendment paper. |
| 10. (Re-presented - formerly dependent claim # _): | Dependent claim re-presented in independent form in current amendment paper. |
| 11. (Previously re-presented): | Dependent claim re-presented in independent form in an earlier amendment, but not currently amended. |

C. Example of Listing of Claims:

Claims 1-5 (cancelled)
Claim 6 (withdrawn)
Claim 7 (previously amended): A bucket with a handle.
Claim 8 (currently amended): A bucket with a ~~green~~ blue handle.
Claim 9 (withdrawn)
Claim 10 (original): A bucket with a wooden handle.
Claim 11 (cancelled)

Claim 12 (new): A bucket with plastic sides and bottom.

Claim 13 (previously added): A bucket having a circumferential upper lip.

Claim 14 (re-presented - formerly claim 11): A black bucket with a wooden handle.

IV. Amendments to the Specification

Amendments to the specification are to be made by presenting replacement paragraphs, sections or a substitute specification marked up to show changes made relative to the immediate prior version, as set out in 37 CFR 1.121(b). The changes should be shown by strikethrough (for deleted matter) or underlining (for added matter). No accompanying "clean" version shall be supplied. The amendments to the specification shall be presented only one time, and will not appear in successive amendment documents.

V. Amendments to the Drawings

Amendments to the drawing figures shall be made by presenting replacement figures which include the desired changes, without markings, and which comply with § 1.84. The changes shall be explained in the accompanying remarks section of the amendment paper. If the amended drawings are not approved, the applicant will be notified in the next Office action. Any amended drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even though only one figure may be amended. The figure number in the amended drawing should not be labeled as "amended."

For further information on the prototype image electronic processing of patent applications, please contact the Search and Information Resources Administration at: **image.processing@uspto.gov**. Any questions regarding the submission of amendments pursuant to the revised practice set forth in this notice should be directed to Elizabeth Dougherty (**Elizabeth.Dougherty@uspto.gov**), Gena Jones (**Eugenia.Jones@uspto.gov**) or Joe Narcavage (mailto:**Joseph.Narcavage@uspto.gov**). For information on the waiver or legal aspects of the program, please contact Jay Lucas (**Jay.Lucas@uspto.gov**) or Rob Clarke (**Robert.Clarke@uspto.gov**).

Date: 1/31/03

Signed: /s/

STEPHEN KUNIN

Deputy Commissioner for Patent
Examination Policy

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